(c) whether Government have secured any business in the space market so far;

(d) if so, the value of exports executed so far; and

(e) the projected business prospects of the Antrix Corporation Ltd.?

THE MINISTER OF STATE IN THE PRIME MINISTER'S OFFICE (SHRI BHUVNESH CHATURVEDI): (a) Yes, Sir. Antrix Corporation Limited is set-up by Government of India under the Administrative control of Department of Space for international/national marketing of Space products and services from India.

(b) The main objectives and the corporate plans of the Corporation are:

(i) Marketing Space products and services in India and abroad.

(ii) Deal with the transfer of technologies developed under the Indian Space Programme to the Indian industries and provide consultancy service.

(iii) Coordinate the Space hardware and software production among ISRO and various Indian industries involved in the Space programme.

(iv) To promote, establish and participate in any collaborative ventures with any company, association or institution for marketing Space hardware.

(c) Yes, Sir. These are as follows:

(i) Study definition of Space Segment System and Assessment of Associated Technologies of LEO Constellation for Hand Held (INMARSAT-P) Services.

(ii) Design, Implementation and Evaluation of Small Omni-directional L/S/UHF Antenna for the INMARSAT-P Hand Held Phone.

(iii) Export of propellant chemicals to LAPAN, Indonesia.

(iv) Providing on-the-job training for Korean Engineers from ETRI, Korea and ARABSAT Engineers.

(v) Benchmaking of FORTRAN Programmes for IBM, Singapore.

(d) US $ 200,000.

(e) The long term plans of the Corporation is to garner atleast 1% of the share of the anticipated world market of US $ 10 billion by 1997.

Damage of engine using cryogenic propellants by explosion

4395. SHRI KAMAL MORARKA: Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that an explosion had damaged an engine which used cryogenic propellants while testing it at the ISRO facility at Thiruvananthapuram;

(b) if so, the details of the blast;

(c) what are the main reasons for the blast;

(d) whether any enquiry has been conducted into the blast; and

(e) if so, the findings thereof?

THE MINISTER OF STATE IN THE PRIME MINISTER'S OFFICE (SHRI BHUVNESH CHATURVEDI): (a) There was a failure of cryo engine hardware during testing of ISRO's test facilities at Mahendragiri in the last week of June, 1993. This was only the failure of hardware and not explosion. There was no damage either to the facility or personnel.

(b) and (c) Several developmental tests have been conducted successfully on the sub-scale engine of one tonne thrust rating with gaseous Hydrogen and liquid Oxygen. In this particular test, for the first time, liquid Hydrogen and liquid Oxygen were used. Since the injection valves for Liquid Oxygen and Liquid Hydrogen are still under development, the test was conducted with a sequence of long chilling by Liquid Nitrogen through the engine.

The failure was due to partial blocking of nozzle throat by the frozen Liquid Nitrogen used for chilling the lines and the resultant over pressure and consequent ripping open of the engine hardware. Such failures are common during development of cryo engines.

(d) and (e) A failure analysis committee has, after analysing the test results, concluded that there was no problem with the engine and has recommended the use of injection valves for liquid Hydrogen and liquid Oxygen feed lines and Helium for purging in future tests.

Scientists working in Space Programmes

4396. SHRI TINDIVANAM G. VENKATRAMAN:
SHRI J. S. RAJU:

Will the PRIME MINISTER be pleased to